

WHAT IS CLAIMED IS:

1. An information processing apparatus comprising:

a drawing omission determination unit that determines whether drawing process corresponding to a graphical drawing instruction, out
5 of a plurality of graphical drawing instructions, can be omitted based on a drawing attribute of a pattern corresponding to the graphical drawing instruction;

a selection unit that makes the graphical drawing instruction invalid if the drawing omission determination unit determines that the
10 drawing process can be omitted, and makes other graphical drawing instructions valid; and

an output unit that outputs to an information processing apparatus the other graphical drawing instructions to get an image corresponding to the other graphical drawing instructions printed.

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2. The information processing apparatus according to claim 1, wherein

the graphical drawing instruction is described in a page description language that includes a basic graphical drawing instruction
20 which specifies a pattern to be drawn, and a drawing attribute instruction which specifies the drawing attribute.

3. The information processing apparatus according to claim 1, wherein

25 the drawing attribute includes information about a color of a

pattern concerning the graphical drawing instruction and a method for performing the drawing process.

4. The information processing apparatus according to claim 3,

5 wherein

the drawing omission determination unit determines that the drawing process can be omitted when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the
10 drawing process regardless of the contents of the memory.

5. The information processing apparatus according to claim 4,

wherein

the drawing omission determination unit determines that the
15 drawing process can be omitted when it is determined from the drawing attribute of a pattern concerning the graphical drawing instruction and a method for performing the drawing process that the contents of a memory at a drawing destination are not changed before and after the drawing process regardless of the contents of the memory.

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6. The information processing apparatus according to claim 5,

wherein

the drawing omission determination unit determines that the drawing process can be omitted when the color density is the lowest
25 and also when the method is a logical sum (OR) among the drawing

attributes of a pattern concerning the graphical drawing instruction.

7. The information processing apparatus according to claim 1,
wherein

5 the drawing omission determination unit determines that the
drawing process can be omitted when a memory at a drawing
destination is in an initialized state.

8. The information processing apparatus according to claim 1,
10 further comprising an output status flag that indicates whether the
selection unit has already set a certain graphical drawing instruction
valid, wherein

the drawing omission determination unit determines whether the
drawing process can be omitted based on the state of the output status
15 flag.

9. The information processing apparatus according to claim 8,
wherein

the drawing omission determination unit determines that the
20 drawing process can be omitted when the output status flag indicates
that the graphical drawing instruction is not yet set valid, and also when
the drawing attribute of a pattern concerning the graphical drawing
instruction does not change the contents of a memory at a drawing
destination before and after the drawing process when the memory is in
25 an initialized state even when the drawing process is carried out..

10. The information processing apparatus according to claim 8,
wherein

the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag indicates
5 that the graphical drawing instruction is not yet set valid, when the color
density is the lowest and also when a method for performing the
drawing process is a replacement (SET) among the drawing attributes
of a pattern concerning the graphical drawing instruction.

10 11. The information processing apparatus according to claim 8,
wherein

the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag indicates
that the graphical drawing instruction is not yet set valid, when the color
15 density is the lowest and also when a method for performing the
drawing process is a logical sum (OR) among the drawing attributes of
a pattern concerning the graphical drawing instruction.

12. The information processing apparatus according to claim 8,
20 wherein

the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag indicates
that the graphical drawing instruction is not yet set valid, when the color
density is the lowest and also when a method for performing the
25 drawing process is an exclusive logical sum (XOR) among the drawing

attributes of a pattern concerning the graphical drawing instruction.

13. The information processing apparatus according to claim 8,
wherein

5 the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag indicates
that the graphical drawing instruction is not yet set valid, when a
method of the drawing process is a logical product (AND) among the
drawing attributes of a pattern concerning the graphical drawing
10 instruction.

14. The information processing apparatus according to claim 8,
wherein

the output status flag indicates whether the selection unit has
15 already set a certain graphical drawing instruction valid for each
graphical drawing instruction concerning an image for one page.

15. The information processing apparatus according to claim 8,
wherein

20 one page is divided into specific number of determination
regions, and the output status flag is provided for each determination
region, and

the drawing omission determination unit determines whether the
drawing can be omitted based on the status of the output status flag for
25 each determination region to which a drawing region concerning the

graphical drawing instruction belongs.

16. The information processing apparatus according to claim 15,
wherein

5 the determination regions are decided based on bands.

17. The information processing apparatus according to claim 1,
wherein

when the graphical drawing instruction concerns a pattern of a
10 color, the drawing omission determination unit determines whether the
drawing process can be omitted for each color plane of the color.

18. The information processing apparatus according to claim 1,
wherein

15 the drawing omission determination unit determines whether the
drawing process can be omitted only when a pattern concerning the
graphical drawing instruction is a graphic pattern.

19. The information processing apparatus according to claim 1,
20 wherein

when a pattern concerning the graphical drawing instruction is
an image pattern, the drawing omission determination unit detects
continuous pixels of the same color within the image pattern, and
determines whether the drawing process can be omitted for each
25 portion of continuous pixels.

20. The information processing apparatus according to claim 1,
wherein

when a pattern concerning the graphical drawing instruction is
an image pattern, the drawing omission determination unit determines
5 whether the drawing process can be omitted of the image pattern in a
word length unit.

21. The information processing apparatus according to claim 1,
wherein

10 the output unit outputs the other graphical drawing instructions
to the image formation apparatus one-by-one.

22. The information processing apparatus according to claim 1,
further comprising a drawing data memory that stores the other

15 graphical drawing instructions, wherein

the output unit outputs the other graphical drawing instructions
stored in the drawing data memory to the image formation apparatus
altogether.

20 23. An image formation apparatus comprising:

a page memory;

a drawing omission determination unit that determines whether
drawing process corresponding to a graphical drawing instruction, out
of a plurality of graphical drawing instructions, can be omitted based on
25 a drawing attribute of a pattern corresponding to the graphical drawing

instruction;

a selection unit that makes the graphical drawing instruction invalid if the drawing omission determination unit determines that the drawing process can be omitted, and makes other graphical drawing instructions valid;

a drawing unit that performs the drawing process to draw an image onto the page memory based on the other graphical drawing instructions; and

an image formation unit that forms an image onto a recording medium paper based on the image on the page memory.

24. The image formation apparatus according to claim 23, wherein the graphical drawing instruction is described in a page description language that includes a basic graphical drawing instruction which specifies a pattern to be drawn, and a drawing attribute instruction which specifies the drawing attribute.

25. The image formation apparatus according to claim 23, wherein the drawing attribute includes information about a color of a pattern concerning the graphical drawing instruction and a method for performing the drawing process.

26. The image formation apparatus according to claim 25, wherein the drawing omission determination unit determines that the drawing process can be omitted when the drawing attribute of a pattern

concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

5 27. The image formation apparatus according to claim 26, wherein
 the drawing omission determination unit determines that the
drawing process can be omitted when it is determined from the drawing
attribute of a pattern concerning the graphical drawing instruction and a
method for performing the drawing process that the contents of a
10 memory at a drawing destination are not changed before and after the
drawing process regardless of the contents of the memory.

28. The image formation apparatus according to claim 27, wherein
 the drawing omission determination unit determines that the
15 drawing process can be omitted when the color density is the lowest
and also when the method is a logical sum (OR) among the drawing
attributes of a pattern concerning the graphical drawing instruction.

29. The image formation apparatus according to claim 23, wherein
20 the drawing omission determination unit determines that the
drawing process can be omitted when a memory at a drawing
destination is in an initialized state.

30. The image formation apparatus according to claim 23, further comprising an output status flag for each graphical drawing instruction, wherein the selection unit sets an output status flag corresponding a certain graphical drawing instruction to set that graphical drawing instruction valid, wherein

the drawing omission determination unit determines whether the drawing process can be omitted based on the state of the output status flag.

31. The image formation apparatus according to claim 30, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set and when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

32. The image formation apparatus according to claim 30, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set, when the color density is the lowest, and when a method for performing the drawing process is a replacement (SET) among the drawing attributes of a pattern concerning the graphical drawing instruction.

33. The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag is not set,
when the color density is the lowest and also when a method for
5 performing the drawing process is a logical sum (OR) among the
drawing attributes of a pattern concerning the graphical drawing
instruction.

34. The image formation apparatus according to claim 30, wherein
10 the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag is not set,
when the color density is the lowest, and when a method for performing
the drawing process is an exclusive logical sum (XOR) among the
drawing attributes of a pattern concerning the graphical drawing
15 instruction.

35. The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the
drawing process can be omitted when the output status flag is not set
20 and when the modification method is a logical product (AND) among the
drawing attributes of a pattern concerning the graphical drawing
instruction.

36. The image formation apparatus according to claim 30, wherein the output status flag indicates whether a certain graphical drawing instruction has been made valid for each graphical drawing instruction concerning an image for one page.

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37. The image formation apparatus according to claim 30, further comprising a dividing unit that divides one page into a specific number of determination regions, and the output status flag is provided for each determination region, and

10 the drawing omission determination unit determines whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

15 38. The image formation apparatus according to claim 37, wherein the dividing unit divides the one page into the determination regions based on bands.

20 39. The image formation apparatus according to claim 23, wherein the graphical drawing instruction concerns a pattern of a color, and the drawing omission determination unit determines whether the drawing process can be omitted for each color plane of the color.

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40. The image formation apparatus according to claim 23, wherein
the drawing omission determination unit determines whether the
drawing process can be omitted when the graphical drawing instruction
corresponds to a graphic pattern.

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41. The image formation apparatus according to claim 23, wherein
when a pattern concerning the graphical drawing instruction is
an image pattern, the drawing omission determination unit detects
continuous pixels of the same color within the image pattern, and
10 determines whether the drawing process can be omitted for each
portion of continuous pixels.

42. The image formation apparatus according to claim 23, wherein
when a pattern concerning the graphical drawing instruction is
15 an image pattern, the drawing omission determination unit determines
whether the drawing process can be omitted of the image pattern in a
word length unit.

43. The image formation apparatus according to claim 23, wherein
20 the output unit outputs the other graphical drawing instructions
to the image formation apparatus one-by-one.

44. The image formation apparatus according to claim 23, further
comprising a drawing data memory that stores the other graphical
25 drawing instructions, wherein

the output unit outputs the other graphical drawing instructions stored in the drawing data memory to the image formation apparatus altogether.

5 45. The image formation apparatus according to claim 24, further comprising:

a receiving unit that receives the drawing instructions from an external source; and

10 an interpreter that converts the drawing instructions into the graphical drawing instructions of a format which is suitable for the drawing process.

46. A drawing processing method comprising:

15 determining whether drawing process corresponding to a plurality of graphical drawing instructions can be omitted based on a drawing attribute of a pattern corresponding to the graphical drawing instruction; and

20 making the graphical drawing instruction invalid if it is determined at the determining that the drawing process can be omitted, and making other graphical drawing instructions valid.

47. The drawing processing method according to claim 46, wherein

the determining includes determining that the drawing process can be omitted when the drawing attribute of a pattern concerning the
25 graphical drawing instruction does not change the contents of a memory

at a drawing destination before and after the drawing process
regardless of the contents of the memory.

48. The drawing processing method according to claim 47, wherein
5 the determining includes determining that the drawing process
can be omitted when it is determined from the drawing attribute of a
pattern concerning the graphical drawing instruction and a method for
performing the drawing process that the contents of a memory at a
drawing destination are not changed before and after the drawing
10 process regardless of the contents of the memory.

49. The drawing processing method according to claim 46, wherein
the determining includes determining that the drawing process
can be omitted when a memory at a drawing destination is in an
15 initialized state.

50. The drawing processing method according to claim 46, wherein
the determining includes determining whether the drawing
process can be omitted based on a state of an output status flag that is
20 set when a certain graphical drawing instruction is made valid.

51. The drawing processing method according to claim 51, wherein
the determining includes determining that the drawing process
can be omitted when the output status flag is not set and when the
25 drawing attribute of a pattern concerning the graphical drawing

instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

5 52. The drawing processing method according to claim 51, wherein
 the output status flag indicates whether a certain graphical
drawing instruction has been made valid for each graphical drawing
instruction concerning an image for one page.

10 53. The drawing processing method according to claim 51, further
 comprising dividing one page into a desired number of determination
regions, wherein the output status flag is provided in each
determination region, and
 the determining includes determining whether the drawing can
15 be omitted based on the status of the output status flag for each
determination region to which a drawing region concerning the
graphical drawing instruction belongs.

54. The drawing processing method according to claim 53, wherein
20 the dividing includes dividing the one page into the determination
regions based on bands.

55. The drawing processing method according to claim 46, wherein
 the graphical drawing instruction concerns a pattern of a color,
25 and the determining includes determining whether the drawing process

can be omitted for each color plane of the color.

56. The drawing processing method according to claim 46, wherein the graphical drawing instruction corresponds to an image pattern, and

5 the determining includes detecting continuous pixels of the same color within the image pattern, and determining whether the drawing process can be omitted for each portion of continuous pixels.

57. The drawing processing method according to claim 46, wherein 10 the graphical drawing instruction corresponds to an image pattern, and

the determining includes determining whether the drawing process can be omitted from the image pattern in a word length unit.

58. A computer program that makes a computer execute:

15 determining whether drawing process corresponding to a plurality of graphical drawing instructions can be omitted based on a drawing attribute of a pattern corresponding to the graphical drawing instruction; and

making the graphical drawing instruction invalid if it is 20 determined at the determining that the drawing process can be omitted, and making other graphical drawing instructions valid.

59. The computer program according to claim 58, wherein

the determining includes determining that the drawing process 25 can be omitted when the drawing attribute of a pattern concerning the

graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

5 60. The computer program according to claim 59, wherein
the determining includes determining that the drawing process
can be omitted when it is determined from the drawing attribute of a
pattern concerning the graphical drawing instruction and a method for
performing the drawing process that the contents of a memory at a
10 drawing destination are not changed before and after the drawing
process regardless of the contents of the memory.

61. The computer program according to claim 58, wherein
the determining includes determining that the drawing process
15 can be omitted when a memory at a drawing destination is in an
initialized state.

62. The computer program according to claim 58, wherein
the determining includes determining whether the drawing
20 process can be omitted based on a state of an output status flag that is
set when a certain graphical drawing instruction is made valid.

63. The computer program according to claim 62, wherein
the determining includes determining that the drawing process
25 can be omitted when the output status flag is not set and when the

drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

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64. The computer program according to claim 62, wherein the output status flag indicates whether a certain graphical drawing instruction has been made valid for each graphical drawing instruction concerning an image for one page.

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65. The computer program according to claim 62, further comprising dividing one page into a desired number of determination regions, wherein the output status flag is provided in each determination region, and

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the determining includes determining whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

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66. The computer program according to claim 65, wherein the dividing includes dividing the one page into the determination regions based on bands.

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67. The computer program according to claim 58, wherein
the graphical drawing instruction concerns a pattern of a color,
and the determining includes determining whether the drawing process
can be omitted for each color plane of the color.

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68. The computer program according to claim 58, wherein the
graphical drawing instruction corresponds to an image pattern, and
the determining includes detecting continuous pixels of the
same color within the image pattern, and determining whether the
10 drawing process can be omitted for each portion of continuous pixels.

69. The computer program according to claim 58, wherein the
graphical drawing instruction corresponds to an image pattern, and
the determining includes determining whether the drawing
15 process can be omitted from the image pattern in a word length unit.